MICROELECTRONIC SUBSTRATE ASSEMBLY PLANARIZING MACHINES AND METHODS OF MECHANICAL AND CHEMICAL-MECHANICAL PLANARIZATION OF MICROELECTRONIC SUBSTRATE ASSEMBLIES

ABSTRACT OF THE DISCLOSURE

A plurality of planarizing machines for microelectronic substrate assemblies, and methods of mechanical and chemical-mechanical planarization of microelectronic substrate assemblies are disclosed. The planarizing machines for processing microelectronic substrate assemblies generally include a table, a pad support assembly either positioned on or in the table, and a planarizing medium coupled to the pad support assembly. The pad support assembly includes a fluid container and an elastic membrane coupled to the fluid container. The fluid container generally is a basin either that is either a separate component that is attached to the table, or a depression in the table itself. The fluid container can also be a bladder attached to the table. The membrane generally has a first surface engaging a portion of the fluid container to define a fluid chamber or cavity, and the membrane has a second surface to which the planarizing medium is attached. The planarizing medium can be a polishing pad attached directly to the second surface of the membrane, or the planarizing medium can be a polishing pad with an under-pad that is attached to the second surface of the membrane. The fluid chamber is filled with support fluid to support the elastic membrane over the fluid chamber. The support fluid can be water, glycerin, air, or other suitable fluids that support the elastic membrane in a manner that allows the membrane and the planarizing medium to freely flex inward into the fluid chamber under the influence of a mechanical force to provide at least a substantially uniform distribution of pressure across the substrate.